CLAIMS

I claim:

1. Apparatus for discovering a signature relevant to a collection of signals and for

    discriminating between and among such signals and for classifying other signals using said

    signature, comprising:

    a) a dictionary of prototype signals;

    b) means for performing comparison between each of the signals in the collection and each

        of the prototype signals in the dictionary;

    c) means for selecting a specific prototype signal based such that for at least one signal of

        the collection the inner product is non zero;

    d) means for recording the selected prototype signal;

    e) means for subtracting from each signal in the collection the projection of each signal on

        the specific prototype signal and for redesignating the subtracted signal as the signal in

        the collection;

    f) means for imposing a stop criterion; and

    g) means for directing the apparatus back to means (b) unless the stop criterion is met.

2. Apparatus for detecting a signature relevant to a collection of signals and for discriminating

    between and among such signals and for classifying other signals using said signature,

    comprising:

    a) a dictionary of prototype signals;

b) means for performing an inner product between each of the signals in the collection and each of the prototype signals in the dictionary;

c) means for selecting a specific prototype signal such that for at least one signal of the collection the inner product is non-zero;

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d) means for recording the specific prototype signal and the inner product of each of the signals from the collection with the prototype signal;

e) means for subtracting from each signal in the collection the projection of the each signal on the specific prototype signal and for redesignating the subtracted signal as the signal in the collection;

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f) means for imposing a stop criterion; and

g) means for directing the apparatus back to means (b) unless the stop criterion is met.

3. Apparatus for detecting a signature relevant to a collection of signals and for discriminating between and among such signals and for classifying other signals using said signature,

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comprising:

a) a dictionary of prototype signals;

b) a subdictionary which is a subset of the dictionary;

c) means for determining a p-norm for the set of signals in the collection with respect to each of the prototype signals in the subdictionary;

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d) means for determining the prototype signal which produces the maximum p-norm with respect to the subdictionary;

e)   means for recording the specific prototype signal and the inner product of each of the signals from the collection with the prototype signal

f)   means for subtracting from each signal in the collection the projection of the each signal on the specific prototype signal and for redesignating the subtracted signal as the signal in the collection;

g)   means for imposing a stop criterion; and

h)   means for directing the apparatus back to means (d) unless the stop criterion is met.

4.   Apparatus for detecting a signature relevant to a collection of signals and for discriminating between and among such signals and for classifying other signals using said signature, comprising:

a)   a dictionary of prototype signals;

b)   a subdictionary which is a subset of the dictionary;

c)   means for determining a p-norm for the set of signals in the collection with respect to each of the prototype signals in the subdictionary;

d)   means for determining the prototype signal which produces the maximum p-norm with respect to the subdictionary;

e)   means for, for each individual signal in the collection, determining a separate prototype signal that locally maximizes the p-norm of the separate prototype signal with the individual signal from the collection;

f)   means for recording the separate prototype signal and the inner product of each individual signal from the collection with each detrmined separate prototype signal;

g) means for subtracting from each signal in the collection the projection of the each signal on the specific prototype signal and for redesignating the subtracted signal as the signal in the collection;

h) means for imposing a stop criterion; and

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i) means for directing the apparatus back to means (d) unless the stop criterion is met.